CLAIMS:

1. An apparatus for replacing at least a portion of an intervertebral disc in a spinal column, comprising:

a first member having a first vertebral contact surface for engagement with an endplate of a first vertebral bone in the spinal column, and having a first saddle shaped articulation surface; and

a second member having a second vertebral contact surface for engagement with an endplate of a second vertebral bone in the spinal column, and having a second saddle shaped articulation surface, wherein:

an intervertebral disc space is defined substantially between the first and second endplates of the first and second vertebral bones, and

the first and second articulation surfaces are sized and shaped to engage one another when the first and second members are disposed in the intervertebral disc space to enable the first and second vertebral bones to articulate in at least one of flexion, extension and lateral bending.

2. The apparatus of claim 1, wherein the first and second articulation surfaces are sized and shaped to define at least one of: (i) a first center of rotation for at least one of flexion and extension that is located outside the intervertebral disc space, and (ii) a second center of rotation for lateral bending that is located outside the intervertebral disc space.

3. The apparatus of claim 2, wherein the first center of rotation is located outside the intervertebral disc space in one direction and the second center of rotation is located outside the intervertebral disc space in an opposite direction.

4. The apparatus of claim 1, wherein the first and second articulation surfaces are formed from one or more metals or metal alloys to achieve metal-to-metal engagement.

5. The apparatus of claim 4, wherein the one or more metals or metal alloys include at least one of cobalt, chromium, stainless steel, and titanium.

6. The apparatus of claim 1, wherein at least one of the first and second articulation surfaces are formed from one or more non-metals.

7. The apparatus of claim 6, wherein the one or more non-metals are taken from the group consisting of polymers and ceramic materials.

8. An apparatus for replacing at least a portion of an intervertebral disc of a spinal column, comprising:

a first member having a first vertebral contact surface for engagement with an endplate of a first vertebral bone, and having a first saddle shaped articulation surface; and

a second member having a second vertebral contact surface for engagement with an endplate of a second vertebral bone, and having a second saddle shaped articulation surface, wherein:

an intervertebral disc space is defined substantially between the first and second endplates of the first and second vertebral bones, and

the first and second articulation surfaces are sized and shaped to engage one another when the first and second members are disposed in the intervertebral disc space to enable the first and second vertebral bones to at least axially rotate relative to one another through a range of angles.

9. The apparatus of claim 8, wherein the first and second articulation surfaces are sized and shaped to achieve substantial point-to-point contact relative to one another when in at least some positions of flexion, extension, lateral bending, and/or axial rotation.

10. The apparatus of claim 8, wherein:

the first saddle shaped articulation surface is defined by a concave arc, generally of radius A about a first axis substantially perpendicular to an anterior-posterior plane of the spinal

column, and a convex arc, generally of radius B about a first axis substantially perpendicular to a lateral plane of the spinal column;

the second saddle shaped articulation surface is defined by a convex arc, generally of radius C about a second axis substantially perpendicular to the anterior-posterior plane of the spinal column, and a concave arc, generally of radius D about a second axis substantially perpendicular to the lateral plane of the spinal column; and

the radius A of the concave arc is greater than the radius C of the convex arc in order to permit axial rotation of the first and second articulation surfaces relative to one another.

11. The apparatus of claim 10, wherein the radius D of the concave arc is greater than the radius B of the convex arc in order to permit axial rotation of the first and second articulation surfaces relative to one another.

12. An apparatus for replacing at least a portion of an intervertebral disc of a spinal column, comprising:

a first member having a first vertebral contact surface for engagement with an endplate of a first vertebral bone, and having a first saddle shaped articulation surface; and

a second member having a second vertebral contact surface for engagement with an endplate of a second vertebral bone, and having a second saddle shaped articulation surface, wherein:

an intervertebral disc space is defined substantially between the first and second endplates of the first and second vertebral bones, and

the first and second articulation surfaces are sized and shaped to engage one another when the first and second members are disposed in the intervertebral disc space to enable the first and second vertebral bones to axially rotate relative to one another through a range of angles without substantially displacing the first and second vertebral bones away from one another.

13. The apparatus of claim 12, wherein the range of angles is about plus/minus three degrees from a resting position.

14. The apparatus of claim 12, wherein the first and second articulation surfaces are sized and shaped such that the first and second vertebral bones are displaced away from one another at axial rotations outside the range of angles.

15. The apparatus of claim 12, wherein:

the first saddle shaped articulation surface is defined by a concave arc, generally of radius A about a first axis substantially perpendicular to an anterior-posterior plane of the spinal column, and a convex arc, generally of radius B about a first axis substantially perpendicular to a lateral plane of the spinal column; and

the second saddle shaped articulation surface is defined by a convex arc, generally of radius C about a second axis substantially perpendicular to the anterior-posterior plane of the spinal column, and a concave arc, generally of radius D about a second axis substantially perpendicular to the lateral plane of the spinal column.

16. The apparatus of claim 15, wherein the radius A of the concave arc is greater than the radius C of the convex arc.

17. The apparatus of claim 15, wherein the radius D of the concave arc is greater than the radius B of the convex arc.

18. The apparatus of claim 15, wherein the radius A of the concave arc is about 0.329 inches, the radius B of the convex arc is about 0.340 inches, the radius C of the convex arc is about 0.280 inches, and the radius D of the concave arc is about 0.401 inches.